



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 77

Docket No.: FAA-2011-1279; Notice No. 11-07

Notification for Airborne Wind Energy Systems (AWES)

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of policy and request for information.

SUMMARY: The FAA seeks comments on revising its policy regarding the application of Title 14 of the Code of Federal Regulations (14 CFR) part 77, "Safe, Efficient Use and Preservation of the Navigable Airspace," to airborne wind energy systems (AWES). In addition, this notice requests information from airborne wind energy system developers and the public related to these systems so that the FAA can comprehensively analyze the AWES and their integration into the National Airspace System (NAS).

DATES: Written comments must be received on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Send comments identified by docket number 2011-1279 using any of the following methods:

- **Federal eRulemaking Portal:** Go to <http://www.regulations.gov> and follow the online instructions for sending your comments electronically.
- **Mail:** Send comments to Docket Operations, M-30; U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, DC 20590-0001.

- Hand Delivery or Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA dockets, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the FEDERAL REGISTER published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov> at any time. Follow the online instructions for accessing the docket or Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: For questions concerning this action, contact Mr. René Joseph (RJ) Balanga, Mission Support Services, Airspace, Regulations and ATC Procedures Group, Air Traffic Organization, AJV-11, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267-8783, e-mail rene.balanga@faa.gov.

SUPPLEMENTARY INFORMATION:**Authority**

Title 49 of the United States Code, section 40103 vests the Administrator with broad authority to regulate the safe and efficient use of the navigable airspace. The Administrator is authorized to issue rules and regulations to govern the flight, navigation, protection, and identification of aircraft for the protection of persons and property on the ground, and for the efficient use of the navigable airspace (49 U.S.C. 40103(b)). The Administrator also is authorized under § 44701(a)(5) to promote safe flight of civil aircraft in air commerce by prescribing regulations and minimum standards for other practices, methods, and procedures necessary for safety in air commerce and national security.

Background

During the past decade, there has been an increased focus on the use of clean renewable energy resources, including wind energy. The FAA has been approached by various entities, including manufacturers, scientists, engineers, and advocacy groups representing the wind energy community, who are researching the use of more sustained and consistent winds at higher altitudes where conventional ground-based wind turbines cannot reach. As part of their research, the energy community is examining various concepts for system designs to harness high altitude winds as a potential source of energy.

Airborne Wind Energy Systems (AWES) are described broadly as mechanical devices that are moored to the ground, via a tether or cabling component, for the purpose of capturing the fluid stream kinetic energy of winds. The kinetic energy captured by the

device is then utilized in various fashions to generate electricity. In one option, the wind energy is immediately converted into consumable power, at the system component keeping the system aloft, and then transferred to the ground by a mechanical tether, cabling conductor, or other method. In another option, the combination of the wind, the aloft device, and the mooring cables are systematically utilized to drive an electrical generator located on the ground.

The basic overall components that comprise various AWESs are fairly similar in concept, however, the technologies and the specific devices that keep them aloft differ dramatically. Such devices have leveraged on similar engineering designs that apply to kites, balloons, kytoons, aircraft wings, aircraft, airfoils, as well as others.¹

Although some of these AWES components could be covered by 14 CFR part 101, *Moored balloons, kites, amateur rockets and unmanned free balloons*, some conceptual designs include hybrid concepts or utilize new innovative techniques that are not as easily classifiable. For example, the FAA identified some AWESs employing “balloon-like” design structures with motorized rotors for vertical and/or horizontal control, resembling a moored airship which does not fall within the category of 14 CFR part 101 devices.² Additionally, the FAA also identified some AWESs that employ a moored kite or balloon with one or more wind capturing devices (wings or blades) attached along the mooring cable that spin a separate cable and activate ground-based power generators. Consequently, the FAA has determined that AWES are unique and would not fall under 14 CFR part 101.

¹ 14 CFR § 1.1 defines a balloon as a “lighter-than-air aircraft that is not engine driven, and that sustains flight through the use of either gas buoyancy or an airborne heater,” and defines a kite as a “framework, covered with paper, cloth, metal, or other material, intended to be flown at the end of a rope or cable, and having as its only support the force of the wind moving past its surfaces.”

Furthermore, since AWES is a relatively new technology that will be used to support clean, renewable energy initiatives, the FAA finds that part 101 does not currently contain the necessary provisions to address these systems.

Whether designed with conventional 14 CFR part 101 type devices or non-conventional hybrid-type components, each AWES possesses differing attributes. These attributes include, but are not limited to, its physical design, how it operates, necessary airspace utilized, radar cross-section, and reflection coefficient. The FAA is concerned with these differing attributes and their unknown impacts to the NAS, navigable airspace, and to the flying public. Therefore, the FAA concludes that each AWES deployment needs to be studied on a case-by-case basis with respect to the surrounding aviation environment to ensure aviation safety.

Policy

Given the altitudes that these structures can operate and their operating characteristics, the FAA concludes that they should be studied and the potential impacts to the navigable airspace must be identified and addressed. Presently, the FAA has an existing regulatory framework that outlines standards for determining obstructions to air navigation or navigational aids or facilities (see 14 CFR part 77). 14 CFR part 77 is utilized to evaluate the impact of wind turbines and other forms of renewable energy on the navigable airspace. Therefore, we conclude that any new forms of wind gathering devices would be included in the Obstruction Evaluation Process, which is administered under 14 CFR part 77.

Accordingly, the FAA announces that the provision of part 77 will apply to temporary AWES proposals that will be used for data collection purposes. The FAA

² 14 CFR § 1.1 defines an airship as, “an engine-driven lighter-than-air aircraft that can be steered.”

finds that the provisions of 14 CFR part 77 can be applied to these “structures” without the need to amend the regulations. Permanent and operational AWES may be addressed in the future upon further evaluations and risk assessments are performed. The purpose of this change in policy is to allow for the continued development of this emerging technology and to provide the FAA with data regarding these devices so that the safety and integrity of the NAS is maintained. Persons proposing to conduct temporary airborne testing of AWES for data collection purposes must provide notice to the FAA pursuant to 14 CFR § 77.13(a)(1), which requires notice of any construction or alternation of more than 200 feet above ground level.

In order to facilitate the timely manner in which AWES proposals are reviewed, AWES developers and operators are requested to limit temporary operations to the following:

- 1) Airborne operations of AWES should be temporary in nature for testing and data collection purposes only;
- 2) Single AWES devices only (e.g. – no “farms” or multiple simultaneous testing);
- 3) AWES should be limited to a single fixed location (e.g. – no mobile ground facilities);
- 4) Testing is confined to heights at or below 499 feet above ground level (AGL);
- 5) Airborne flight testing of AWES will only occur during daylight hours; and
- 6) AWES will be made conspicuous to the flying public. (The sponsor of the AWES will provide the FAA with their marking and lighting scheme. FAA Advisory Circular 70/7460-1K (AC 70/7460-1K), Obstruction Marking and Lighting.

currently does not address AWES, but may be used as a guide, as some portions may be applicable.)

Request for Information

The FAA is working jointly with industry, the Department of Energy, as well as other airspace stakeholders, and believes that additional information from AWES developers would be beneficial. The information will assist the FAA as it considers long-term policies and guidance to integrate the AWES safely into the NAS.

The FAA has several concerns regarding AWES operations in the NAS, including:

- 1) Impact(s) to various surveillance systems (radars);
- 2) Conspicuity to aircraft (marking and lighting);
- 3) Overall safety – safety to other airspace users, safety to persons and property on the ground, safety to the efficient and effective use of NAS facilities, safety to airports, safety to air commerce, and safety to the efficient operations and managing of the NAS;
- 4) AWES fly-away protection (mooring cable is severed);
- 5) AWES physical dimensions per unit and per farm;
- 6) AWES operating dimensions per unit and per farm (amt. of airspace it may require);
- 7) AWES mobility (potential for AWES to relocate from physical ground location to a different ground location); and
- 8) Wake turbulence or vortices of wind capturing component(s).

The FAA recognizes the various design concepts utilized by AWES developers for components of their overall AWES. These may include the components that keep the system aloft, the power generating equipment, the energy transferring equipment, the maneuvering controls, and the physical and operational dimensions, amongst others. Given these variations in technologies, the FAA seeks information from the industry to help us evaluate the potential risks of permanent AWES and AWES farms operating in the NAS.

The FAA is requesting AWES sponsors provide information on the following. Additional information may be requested upon further contact and coordination. This information must be submitted by **[insert date 60 days from issuance publication in the Federal Register]**.

- General information on a developer's specific AWES design concept and plans for operation.
 - What type(s) of mechanical devices are you employing to keep the system aloft?
 - What are the physical dimensions of the device(s) with relation to the above?
 - What kind of materials will comprise this device?
 - What are the operational dimensions (requirement for airspace) for the system?
 - Is there a requirement to operation more than one device in the air?
 - What are your long-term plans for this system?
- Marking and lighting.

- Can you comply with marking and lighting requirements?
- Can you identify any impacts to your system when complying with current guidance for marking and lighting standards?
- What are your plans or how is your system designed to make the system conspicuous to the flying public?
- Safety to other airspace users and persons and property on the ground.
 - What safety mechanisms or devices have you designed into the system to ensure all aspects of aviation safety?
 - What safety mechanisms or devices have you designed into the system to minimize or mitigate hazards to persons or property on the ground?
- Minimized impacts to NAS facilities.
 - What are your plans or how is your system designed to reduce a large radar cross-section and become less conspicuous to surveillance systems?
 - What are your plans or how is your system designed to reduce impacts to any communication or navigation systems supporting the NAS?

In addition, the FAA is requesting input from airspace users regarding the impact AWES would have on the NAS. Specifically, we request airspace users provide comments to the following. Additional information may be requested upon further contact and coordination. This information must be submitted by **[insert date 60 days from issuance publication in the Federal Register]**.

- What safety implications do you foresee of AWES operations with respect to your use of the airspace or your interest to the NAS?

- Would you have any concerns about AWES permanently operating at altitudes above 500 feet AGL, but, under 1,999 feet AGL? If so, what and why?
- If AWES were permitted to permanently operate in altitudes at or above 2,000 feet AGL, how do you foresee this as negatively impacting your missions, use of the airspace, or other interests in the NAS?
- What other concerns and/or issues might you have with respect to AWES co-existing in the NAS?

Comments Invited

The FAA invites interested persons to submit written comments, data, or views. The agency also invites comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. To ensure the docket does not contain duplicate comments, commenters should send only one copy of written comments, or if comments are filed electronically, commenters should submit only one time.

The FAA will file in the docket all comments it receives. Before acting on this proposal, the FAA will consider all comments it receives on or before the closing date for comments. The FAA will consider comments filed after the comment period has closed if it is possible to do so without incurring expense or delay. The agency may change this proposal in light of the comments it receives.

Proprietary or Confidential Business Information: Commenters should not file proprietary or confidential business information in the docket. Such information must be sent or delivered directly to the person identified in the FOR FURTHER INFORMATION CONTACT section of this document, and marked as proprietary or confidential. If submitting information on a disk or CD ROM, mark the outside of the disk or CD ROM, and identify electronically within the disk or CD ROM the specific information that is proprietary or confidential.

Under 14 CFR 11.35(b), the FAA is aware of proprietary information filed with a comment, the agency does not place it in the docket. It is held in a separate file to which the public does not have access, and the FAA places a note in the docket that it has received it. If the FAA receives a request to examine or copy this information, it treats it as any other request under the Freedom of Information Act (5 U.S.C. 552). The FAA processes such a request under Department of Transportation procedures found in 49 CFR part 7.

Issued in Washington, DC on November 30, 2011.

Dennis E. Roberts
Director of Airspace Services

[FR Doc. 2011-31430 Filed 12/06/2011 at 8:45 am; Publication Date: 12/07/2011]